Clean Air Standards

The Clean Air Act established two types of national air quality standards, primary and secondary. Primary standards set limits to protect public health, including the health of "sensitive" populations such as children, the elderly and those with respiratory illnesses. Secondary standards set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation and buildings.

New Standards

In 1997, EPA established new health-based standards for ground-level **ozone** and **fine particulate matter**. Extensive scientific review showed that the changes to the standards were necessary to protect public health and the environment. However, the new standards were challenged in court. In May 1999, the U.S. Court of Appeals for the District of Columbia Circuit declared that the new standards were not enforceable. The U.S. Supreme Court heard EPA's appeal of the decision. The Supreme Court decision upheld the new EPA standards, although it ordered EPA to revise its **ozone** strategy. It also required EPA to continue to apply the previous **ozone** and particulate matter standards.

Fine Particulate Matter: $PM_{2.5}$ versus PM_{10}

In revising the air quality standards, EPA created new standards for **$PM_{2.5}$** (fine particulate matter less than 2.5 microns in diameter). EPA's scientific review concluded that fine particles (**$PM_{2.5}$**) that penetrate deeply into the lungs are more damaging to human health than the coarse particles known as **PM_{10}**. Fine particles are more likely than coarse particles to contribute to such health effects as premature death, increased hospital admissions and emergency visits, especially for the elderly and individuals with cardiopulmonary disease. However, coarse particles can accumulate in the respiratory system and aggravate health problems such as asthma. Therefore, the standards for **PM_{10}** particles are retained.

Air Quality Monitors in Missouri

In 2002, the Missouri Air Pollution Monitoring Network included 165 monitors of three types: national monitors, state and local agency monitors, and special-purpose monitors. National monitors are used to provide data on national trends. State and local agencies operate permanent monitors to measure ambient concentrations of pollutants on the list of **National Ambient Air Quality Standards**. Special-purpose monitors are placed to gather representative data as well as worst-case occurrences. Data is also being collected at 24 meteorological monitors operating throughout the state. The data collected at these monitors is used for analysis and modeling purposes.

For more information on the Missouri Air Pollution Monitoring Network visit www.dnr.mo.gov/alpd/esp/esp_aqm.htm.

National Ambient Air Quality Standards

CRITERIA AIR POLLUTANT	AVERAGING TIME	PRIMARY STANDARD	SECONDARY STANDARD	HEALTH EFFECTS
Carbon Monoxide	Eight-hour maximum[a] One-hour maximum[a]	9 ppm (10 mg/m^3) 35 ppm[b] (40 mg/m^3) [c]	None None	Impaired vision and manual dexterity, weakness and mental dullness. At high levels: vomiting, fast pulse and breathing, followed by slow pulse and breathing, then collapse and unconsciousness.
Lead	Maximum Quarterly Arithmetic Mean	1.5 µg/m^3	Same As Primary Standard	Low doses damage the central nervous system of children and unborn infants, causing seizures, mental retardation and behavioral disorders. In children and adults lead causes fatigue, disturbed sleep, decreased fitness and damage to kidneys, liver and blood-forming organs. High levels damage the nervous system and cause seizures, coma and death.
Nitrogen Dioxide	Annual Arithmetic Mean	0.05 ppm (100 µg/m^3)	Same As Primary Standard	Lung inflammation and lower resistance to infections like bronchitis and pneumonia. Suspected of causing acute respiratory diseases in children.
Ozone	One-hour average[a] Eight-hour average	0.12 ppm (235 µg/m^3) 0.08 ppm	Same As Primary Standard	Throat irritation, congestion, chest pains, nausea and labored breathing. Aggravation of existing lung or heart conditions, allergies and asthma-. Ozone is especially harmful to those who work or play outside. Ozone is also harmful to plant life, damaging forests and reducing crop yields.
Fine Particulate Matter (PM2.5)	Annual Arithmetic Mean Three year average 24-hour average, 98th percentile	15 µg/m^3 65 µg/m^3	Same As Primary Standard	Contribute to premature death, increased hospital admissions and emergency visits, especially for the elderly and individuals with cardiopulmonary disease.
Particulate Matter (PM_{10})	Annual Arithmetic Mean 24-hour average[f]	50 µg/m^3 150 µg/m^3	Same As Primary Standard	Increased likelihood of chronic or acute respiratory illness. Difficulty breathing, aggravation of existing respiratory or cardiovascular illness and lung damage.
Sulfur Dioxide	Annual Arithmetic Mean 24-hour maximum[a] Three-hour maximum[a]	0.03 ppm (80 µg/m^3) 0.14 ppm (365 µg/m^3)	 0.5 ppm (1300 µg/m^3)	Irritation of throat and lungs with difficulty in breathing. Aggravation of existing respiratory or cardiovascular illness.

a Not to be exceeded more than once a year for primary and secondary standards.
b mg/m3 = milligrams per cubic meter.
c Established for a three year average of the fourth highest daily maximum value.
d ppm = part per million.
e mg/m3 = micrograms per cubic meter.
f No more than one expected exceedance, three year average.